MARSHALL STAR

Marshall Space Flight Center — *April 12, 2001*

NASA's FY 2002 budget released

by Debra Valine

NASA released details of the president's FY 2002 budget for NASA Monday. The budget provides a 2 percent increase in funding for NASA, and includes strong support for the Space Launch Initiative and for improving aviation safety, space science programs, Earth sciences and for Space Shuttle safety improvements.

Photo by Terry Leibold, NASA/Marshall Space Flight Center

Marshall Center Director Art Stephenson answers a question posed by Dr. Chris Barret following the all-hands meeting.

"The president has challenged NASA to examine its priorities to ensure that the workforce and institutions are most effectively focused on those key efforts that are most important to moving the country forward in the pursuit of science and technology discoveries," said NASA Administrator Dan Goldin. "We will support the president."

The FY 2002 budget draws on NASA's strengths in engineering and science and reflects the revolutionary insights and capabilities on the horizon in areas such as biotechnology, nanotechnology and information technology.

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Inside the Star

Paving the way for NASA's X-37 space plane, X-40A second free flight set for Thursday

The X-40A vehicle is scheduled for the second in a series free flight tests Thursday at Dryden Flight Research Center at Edwards, Calif. The X-40A will be lifted by an Army Chinook helicopter and released.

The X-40A's free flight and landing tests are being conducted as part of NASA's X-37 program, intended to reduce the risk of flight testing the X-37 experimental re-entry vehicle. The X-37 will enable NASA to test advanced technologies in the harsh environment of space and in returning through Earth's atmosphere. The X-40A is an 85 percent scale version of the X-37.

Thursday's X-40A test objectives focus on complex vehicle maneuvers, while the first free flight test on March 14 focused on a straight-in vehicle approach. Both tests demonstrated flight control and autonomous landing systems. A series of up to seven free flights is planned.

The X-40A test vehicle, on loan from the Air Force, was built for the Air Force by The Boeing Company at its Seal Beach, Calif., facility. It has received upgraded instruments and telemetry, focused on integrating the unique charactericstics of the X-37 design.

The Marshall Center, NASA's lead center for space transportation systems development, manages the X-37 program. Dryden Flight Research Center is responsible for the X-37/X-40A flight test activities.

Astronauts Young, Crippen join Marshall to mark Shuttle anniversary

STS-1 Commander John Young and Pilot Robert Crippen will join Marshall team members April 24 to mark the 20th anniversary of the first Space Shuttle mission.

The celebration will be from 10 a.m. to 1 p.m. in the North Structure of Bldg. 4752 and at the nearby Marshall picnic area.

Lunch will be served in the Marshall picnic area from 11 a.m. until noon.

There is no charge to attend any of the celebration activities. However, meal tickets are $3.50 each, for a choice of barbecue sandwich or garden salad. The meal includes chips, a drink and an opportunity to enjoy a slice of STS-1 celebration cake after lunch.

Tickets are available through April 19 from administrative officers or at the NASA Exchange in Bldg. 4752.

Young

Crippen

Budget

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"We face some difficult decisions and will take a close look at program priorities and supporting capabilities at our NASA field installations," Goldin said. "We will continue to review the need for certain NASA facilities where the continuing cost of maintaining an aging infrastructure should yield to the development of newer plants more closely tied to advancing technology.

"Along with the funds requested comes the imperative to execute and meet our commitments," he said. "The president fully expects NASA to live within the requested funding levels, and is aware that doing so will require some difficult decisions.

"We are proposing to Congress in this budget plan that some lower priority activities be eliminated to allow for a much more vigorous space and science exploration program. However, from such cancellations comes an increased emphasis on computational, information and communication technology, 21st Century aircraft technology and a more robust Earth science follow-on program, among others," he said.

Marshall's perspective

The proposed budget was received as good news for the Marshall Center. Marshall will continue its key role in NASA's top three priorities: Space Shuttle, International Space Station and lead the Space Launch Initiative — 1) Shuttle upgrades 2) 2nd generation Earth-to-orbit and 3) 3rd generation Earth-to-orbit and advanced in-space transportation.

"This is the second year of Space Launch Initiative (SLI)," said Marshall Center Director Art Stephenson. "The FY2002 budget shows an SLI increase of 64 percent. That is the largest increase of any program in NASA. We are fortunate to be leading this No. 1 priority development program."

The goal of the Space Launch Initiative is for NASA to meet its future space flight needs, including human access to space, using commercial launch vehicles that will reduce cost and improve safety and reliability.

To accomplish this goal, four principles exist:

• Commercial convergence — flying on privately owned and operated launch vehicles.

• Competition — bringing innovation and new ideas to bear.

• Assured Access — ensuring alternate means of getting to space despite launch mishaps.

• The ability to evolve — adding new capabilities affordably as new mission needs emerge.

"We will be upgrading the Space Shuttle to fly more safely," Stephenson said. "We had planned to go to eight Shuttle flights a year, but the President's budget calls for six flights per year.

"There are some Space Station budget challenges," he said. "We are also being challenged to dramatically improve in-space propulsion systems to enable planetary exploration missions.

"The Marshall Center overall will receive a 2 percent increase from $2,224 million to $2,273 million," Stephenson said. "The only area where Marshall will see a decrease is in human exploration and development of space." Stephenson said he is concerned about funding levels in microgravity research and said he is actively engaged in discussions with the Space Station Program Office at Johnson Space Center and Code U at NASA Headquarters.

For complete information on the NASA FY2002 budget, visit the Web at: *http://www.nasa.gov*

The writer, employed by ASRI, is the Marshall Star editor.

Highlights of the budget from Marshall's perspective

- Marshall's budget is going up from $2.2 billion in FY01 to $2.8 billion in FY06
- Civil service staffing will increase by 80 full-time employees by the end of FY02
- The Space Launch Initiative budget from FY02 to FY06 will be $4.5 billion
- The Space Science and Earth Science budgets are stable
- The budget includes approved Space Shuttle safety upgrades

Missouri, Kansas teams top 'Great Moonbuggy Race'

by Jack Robertson

Graff Career Center in Springfield, Mo., rode to victory Friday in the high school division of NASA's 8th annual "Great Moonbuggy Race" at the U.S. Space & Rocket Center.

The Graff team beat out more than a dozen other high schools from around the nation for the top spot. Besides the first place honor, the team earned a weekend trip to Space Camp at the Space & Rocket Center.

Team No. 1 from New Orleans area high schools in New Orleans, La., finished second, while team No.1 from Autauga County Technical Center of Prattville, Ala., placed third. Those teams received plaques, and all three winning teams received jackets bearing the Great Moonbuggy Race logo.

The award for best moonbuggy design went to team No. 1 from Lafayette County high school in Higginsville, Mo. A special "pits award" for ingenuity and persistence went to both teams from Autauga County Technical Center.

In the college division Saturday, team No. 2 from Pittsburg State University in Pittsburg, Kan., took first place over colleges and universities from 18 states and Puerto Rico. The team earned a trip to Kennedy Space Center, Fla., to view a Space Shuttle launch.

The University of New Hampshire from Durham, N.H., finished second, while the College of New Jersey team from Ewing, N.J., placed third. Those teams received plaques, and all three winning teams received jackets bearing the Great Moonbuggy Race logo.

The award for best moonbuggy design went to the University of New Hampshire. A special "pitts award" for ingenuity and persistence went to the team from Cornell University of Ithaca, N.Y.

Photos by Jeff Wolfe, NASA/Marshall Space Flight Center

A Pittsburg State University team heads for the finish line to win the college division of the 2001 Great Moonbuggy Race.

The competition is inspired by the actual lunar roving vehicle project, which was successfully accomplished by the Marshall Center in the 1960s and 1970s. The race challenges students to design and build a human-powered vehicle so they will learn how to deal with real-world engineering problems — similar to those faced by the original NASA moonbuggy team.

Graff Career Center rumbles through "lunar" terrain to win the high school division.

Vehicles powered by two team members, one male and one female, race one at a time over a half-mile obstacle course of simulated moonscape terrain.

The event is sponsored by the Marshall Center, the U.S. Space & Rocket Center, the American Institute of Aeronautics and Astronautics and the Alabama Aerospace Development Board. The event is hosted by the Education Programs Department, Customer and Employee Relations Directorate.

Other competing high school teams were New Century Technology High School in Huntsville, Ala.; Carbondale Community High School, Carbondale, Ill.; Labette County High School in Altamont, Kan.; Pittsburg High School in Pittsburg, Kan.; Carthage High School, Carthage, Mo.; UniTec Career Center in Farmington, Mo.; Lansing High School in Lansing, N.Y.; and Pinewood Preparatory School in Summerville, S.C.

Competing colleges also included University of Alabama at Birmingham; University of South Alabama in Mobile; University of Alabama in Tuscaloosa; Arizona State University in Tempe Embry-Riddle Aeronautical University in Daytona Beach, Fla.; Southern Illinois University in Carbondale; Purdue University in Indianapolis; University of New Orleans in New Orleans; North Dakota State University in Fargo; Rochester Institute of Technology in Rochester, N.Y.; Cameron University in Lawton, Okla.; University of Puerto Rico in Humacao; South Carolina State University in Orangeburg; Tennessee Technological University in Cookeville; University of Tennessee in Knoxville; and Christian Brothers University in Memphis.

The writer, employed by ASRI, supports the Media Relations Department.

Marshall Center co-hosts first-ever rapid prototyping workshop

by Ken Cooper

The Rapid Prototyping and Tooling for Metalcasting Applications workshop was held at the Bevill Center April 5-6.

The workshop was co-sponsored by the Marshall Center and the American MetalCast Consortium (AMC). It introduced regional metalcasters and foundrymen to the cost- and time-savings benefits of using Rapid Prototyping technologies in the casting industry.

The session included a keynote address from Marshall Associate Director Axel Roth, and more than a day of informative case studies by users in the field. The 75 attendees gained a keener awareness of powerful technologies and how they may apply them to their operations. Participants were from industry and government, including the U.S. Army Aviation and Missile Command.

The American MetalCast Consortium is sponsored by the Defense Logistics Agency and is made up of the top four metalcasting technology and trade associations. The consortium has direct access to more than 2,800 metalcasters, and activity with more than 200 companies.

The Marshall Center was chosen as co-host due to the vast array of rapid prototyping technologies available under one roof, in addition to in-house experience with metal casting from rapid prototyped patterns.

It is anticipated the workshop will become an annual event.

The writer is a structural materials engineer in the Nonmetallic Materials Group.

Weisskopf, Stahl named fellows in optical engineering society

Weisskopf

Stahl

Dr. Martin Weisskopf and Dr. H. Philip Stahl have been selected as fellows in SPIE — The International Society for Optical Engineering. Their induction brings the number of Marshall employees who are fellows in the society to four.

Jim Bilbro, assistant to the Center Director for optics, and Richard Hoover, an astrobiologist in Marshall's Science Directorate, are also fellows and serve on the society's 2001 executive board.

Fellows are distinguished individuals who have made significant scientific and technical contributions in optics and optoelectronics. In addition, they are recognized for their service to the general optics community and to SPIE in particular.

SPIE is an international technical society dedicated to promoting the engineering and scientific applications of optical, photonic, imaging and optoelectronic technologies through its education and communications programs, meetings and publications.

Today SPIE is the largest international professional engineering society serving the practicing engineer and scientist in the field of optics and photonics. The society serves the global technical and business communities, with more than 15,000 individual, 320 corporate and 3,000 technical group members in more than 80 countries worldwide.

"There are only 282 fellows in the society, and two from Marshall serve on the executive board," Bilbro said. Hoover, who was named a fellow in 1991, serves as the society president this year. Bilbro, a fellow since 1992, is secretary. "This is indicative of Marshall's role internationally. A lot of people in the Huntsville community have played a big role in the society."

Weisskopf is project scientist for NASA's Chandra X-ray Observatory and chief of the X-ray Astronomy at the Marshall Center. He earned his doctorate in physics from Brandeis University in Waltham, Mass.

Weisskopf has held numerous special appointments during his career. He is a senior co-investigator of the European Space Agency's international X-ray imaging experiment, called IBIS, and holds a similar position for an experiment to fly on the SPECTRUM-X mission being developed for X-ray study by the Russian Space Research Institute. He is principal investigator of a major experimental research program initiated in 1978 that currently concentrates on the development of X-ray optics.

Stahl earned his doctorate in optical sciences from the University of Arizona Optical Sciences Center in Tucson in 1985. He is a senior optical physicist at Marshall where he is the Next Generation Space Telescope Mirror technology lead, the Next Generation Space Telescope Center Lead and the SOMTEC Optical Technologies group lead. In addition to his work with the Next Generation Space Telescope , Stahl is supporting a collaborative NIST absolute testing activity, Constellation X mandrel testing and several microgravity experiments.

Stahl is a leading authority in optical metrology, optical engineering, and phase-measuring interferometry. Many of the world's largest telescopes have been fabricated with the aid of high-speed and infrared phase-measuring Interferometers developed by him, including the Keck, VLT and Gemini telescopes.

STS-98 crew visits Marshall

Crew members of the Space Shuttle Atlantis STS-98 mission — who attached the U.S. science laboratory Destiny to the International Space Station — will visit Marshall Friday. Destiny was built at the Marshall Center by The Boeing Company. During their visit, the crew will present mission highlights in Morris Auditorium at 10:15 a.m. In the afternoon, the crew will present "Silver Snoopy" awards to Marshall employees who contributed to the success of the Space Shuttle or International space Station programs.

Endeavour's mission will extend Space Station's reach with next-generation robotics; launch set for April 19

NASA release

The Space Shuttle Endeavour is ready to soar into orbit April 19 on another International Space Station construction mission that will extend the reach of humans in orbit.

Endeavour and its seven-member international crew will deliver a new generation of Canadian space robotics to the International Space Station. The robotic arm is longer, stronger, more flexible and more capable than the Space Shuttle's venerable arm.

The Marshall Center's Payload Carriers Team, part of the Hardware Development and Integration Group, built in-house the launch support assembly being used to transport the Canadian Arm, and various adapters being used to attach other items such as the UHF antenna to the Spacelab pallet. The Marshall Center is responsible for the analytical integration of the 6A pallet cargo element. The physical integration is done at Kennedy Space Center in Florida.

Shuttle managers set the launch for 1:41 p.m. CDT from Kennedy on an 11-day mission that will continue the rapid pace of assembly that has transformed the orbiting complex during the past eight months into the largest and most sophisticated space laboratory ever built.

"The launch of Endeavour marks a significant milestone for us in that it completes a quick, safe and successful full turnaround of the Space Shuttle fleet dedicated to assembly of the station in only a few months," Space Shuttle Program Manager Ron Dittemore said. "Once Endeavour arrives on this flight, all three shuttles capable of docking with the station will have done so twice in the past eight months. The International Space Station's assembly has relied on our ability to maintain a schedule of regular launches to complete uniquely complex missions, and the shuttle team has come through in safe, successful and spectacular fashion."

In addition to the Canadarm2, which is the centerpiece of Canada's contribution to the International Space Station, Endeavour's flight, designated STS-100, also will carry the second Italian Space Agency logistics carrier, a module named Raffaello. Endeavour's flight is planned to include the most complex and intricate robotics work ever conducted in space to install the arm, as well as to deliver more research equipment and experiments to the station than any previous mission.

Commanded by Kent Rominger, Endeavour's crew represents the most diverse crew to ever fly in space with four international partner space agencies. The shuttle's pilot is Jeff Ashby and includes mission specialists John Phillips and Scott Parazynski. Chris Hadfield, a Canadian Space Agency astronaut; Umberto Guidoni, a European Space Agency astronaut; and Yuri Lonchakov, a Russian Aviation and Space Agency cosmonaut round out Endeavour's crew. The Shuttle is scheduled to land April 30 at the Kennedy Space Center.

More information is on the Web at: *http://spaceflight.nasa.gov/shuttle/*

Brown named NASA associate administrator for public affairs

NASA release

Jerry Brown, a senior corporate communications executive, has been named NASA's associate administrator for public affairs.

Before joining NASA, Brown was vice president for Walls Communications Inc., based in Washington, D.C., where he served as senior counsel to the firm's Fortune 100 clients. Brown has more than 20 years experience in international, corporate and federal government communications.

"Jerry Brown has a distinguished track record of innovation and team building," said NASA Administrator Dan Goldin. "His diverse background and legacy of achievement will be important assets to this agency."

In 1992, Brown was appointed deputy director of the Office of External Affairs for the U.S. Agency for International Development for the Administration of President George Bush. In that capacity he managed press relations. Brown also served as the director of public affairs at the Federal Transit Administration for the U.S. Department of Transportation.

As a public relations director, Brown developed media relations programs for Winrock International, Winthrop Rockefeller's global philanthropic organization, and he is one of only three westerners to serve as an international representative in Saudi Arabia for the largest public relations firm in the Pan-Arab world, Tihama.

Brown also has extensive experience in the oil and gas industries where he worked as an editor for Exxon Company USA, based in Houston, Texas.

A native of Kansas City, Mo., Brown has a bachelor's degree from the University of Houston. He lives in Arlington, Va.

Photo by Terry Leibold, NASA/Marshall Space Flight Center

Thank you, Easter Bunny

Kinsey Nabors, daughter of Sammy Nabors in Marshall's Technology Transfer Department, shows the Easter Bunny her appreciation for coming to Marshall's Egg Hunt March 31. The annual Egg Hunt is sponsored by the NASA Exchange and organized by Gena Marsh of the Internal Relations and Communications Department.

Gamma-ray bursts may originate in star-forming regions

NASA release

New findings from two X-ray satellites suggest that gamma-ray bursts, some of the most intense blasts in the Universe, may be created in the same area where stars are born.

Dr. Luigi Piro of the Consiglio Nazionale delle Ricerche (CNR) in Rome, Italy, presented data from the Marshall-managed Chandra X-ray Observatory and the Italian-Dutch ASI BeppoSAX observatory last week at the Gamma Ray 2001 conference in Baltimore, Md.

"We know that when a gamma-ray burst explodes, it produces a blast of material called a fireball, which expands at relativistic speeds like a rapidly inflating bubble," said Piro, who works within CNR's Istituto di Astrofisica Spaziale. "Our team found evidence that the blast wave caused by the fireball brakes against a wall of very dense gas, which we believe is the crowded region where stars form."

Several theories exist about what causes gamma-ray bursts. Among more popular theories are that gamma-ray bursts come from various combinations of merging neutron stars and black holes, or, from the explosion of massive stars, called hypernovae.

"Because gamma-ray bursts are going off in extremely distant galaxies, it is difficult to 'see' the regions that harbor them," said Piro. "We can only gather circumstantial evidence as to where and how they form."

Piro's observations support the hypernova model. Scientists believe that within dense star-forming regions, the massive star required for a hypernova explosion evolves extremely rapidly. On astronomical time scales, the supermassive star would evolve over the course of only about one million years.

For more information, visit the Web at: *http://chandra.harvard.edu* and *http://chandra.nasa.gov*

Space Foundation names two Marshall innovations to Space Technology Hall of Fame

by Lynnette Madison

Video Image Stabilization and Registration (VISAR) and Data Matrix Symbology — both technology innovations from the Marshall Center — will be two of the three innovations inducted into the Space Foundation's Space Technology Hall of Fame during ceremonies Thursday at the National Space Symposium in Colorado Springs, Colo.

The Space Technology Hall of Fame honors technologies originally developed for space applications that have been commercialized to benefit life on Earth. The Space Technology Hall of Fame was established in 1988 through a joint venture of the Space Foundation and NASA to honor innovators who have transformed technology developed for space use into commercial projects; to increase awareness of the benefits of space spin-off technology; and to encourage further innovation. Each year, technologies are nominated and go through a rigorous selection process before final selection and induction into the Hall of Fame. To date, more than 30 technologies have been inducted.

The Marshall Center, Intergraph, Barco and the Federal Bureau of Investigation have developed VISAR, a new technology that can dramatically improve images including crime scene videos. Dark jittery images captured by home video, security systems and video cameras in police cars are turned into clearer, stable images that reveal clues about crimes. The technology produces clearer images of moving objects, smoothes jagged edges and enhances still images.

Compressed symbology is a two-dimensional symbol marking system developed for the Space Shuttle Program, where millions of parts must be tracked. The two dimensional symbol — a Data Matrix symbol resembling a checkerboard — is capable of storing as much as 100 times more information than a one-dimensional linear barcode in the same amount of space. NASA and the RVSI Symbology Research Center worked together on this technology and moved it into acceptance as the standard for auto parts and medical parts. Finally, it will be adopted this year as the standard marking technology for all NASA parts.

The National Space Symposium is conducted by the Space Foundation, and takes place April 9-12 in Colorado Springs.

The Marshall Center is NASA's premier organization for development of space transportation and propulsion systems, NASA's leader in microgravity research — unique scientific studies conducted in the near-weightlessness of space — and NASA's leader for advanced large optics manufacturing technology. Marshall also is responsible for developing advanced space transportation systems designed to further humankind's exploration of space while slashing the cost of getting there from today's $10,000 per pound to only hundreds of dollars per pound, or even less.

For additional information on VISAR, visit the Marshall Center News Web site at:

http://www1.msfc.nasa.gov/NEWSROOM/news/releases/2000/00-257.html

For more information on Data Matrix Symbology, visit our Web site at: http://www1.msfc.nasa.gov/NEWSROOM/news/releases/2000/00-233.html

For additional Hall of Fame information, visit the Foundation's web site at: http://www.spacefoundation.org

The writer, employed by ASRI, supports the Media Relations Department.

Students, teachers put on spacecraft engineer hats in NASA program geared to real-world learning

by Jonathan Baggs

When students from five states participated in NASA's Earth to Orbit Engineering Design Spacecraft Structures Challenge, they tackled some of the same issues NASA engineers face when designing spacecraft.

To enhance their experience, more than 25 middle school and high school students and teachers will visit the Marshall Center April 19-21 to see some of the space agency's work firsthand.

The NASA-sponsored program is aimed at letting students in their classrooms experience some of the challenges faced by NASA engineers designing the next generation of aerospace vehicles. It also helps students achieve national goals for developing science, math and thinking skills.

Using educational materials provided by NASA, teachers decide the appropriate time during the school year for students to tackle the program's hands-on activities. The challenge is targeted at students in grades 6-9 and open to all schools.

"The program challenges the students to think like NASA engineers," said Alicia Beam, pre-college officer with Marshall's Education Programs Office.

Teachers wishing to participate or obtain more information about the Earth to Orbit Engineering Design Challenges can go to the ETO Web site at: *eto.nasa.gov*

The writer, employed by ASRI, supports the Media Relations Department.

American-Russian scientist team studying ancient microorganisms for clues to extraterrestrial life

by Debra Valine

Laying the groundwork in a search for extraterrestrial life, Alexei Rozanov, director of the Paleontological Institute of the Russian Academy of Sciences in Moscow, is working with Marshall astrobiologist Richard Hoover to study ancient microorganisms found in Earth rocks and meteorites.

They have found microfossils of several types of bacteria and phytoplankton microorganisms both in Earth's sedimentary rocks and remarkably similar mineralized microfossils in carbonaceous meteorites.

"We compare recent bacteria with ancient microfossils found in rocks and meteorites," Rozanov said. "We recognize a lot of similarities with real fossil bacteria that we can find in ancient rocks and in meteorites. Sometimes it is not so well preserved, but other times it is very well preserved."

The two have published many papers on ancient microorganisms, and will co-chair the NATO Advanced Study Institute in Chania, Crete, Sept. 29 through Oct 10.

The institute provides a systematic, in-depth, treatment of the new and rapidly developing field of astrobiology. "It is a very complicated field," Rozanov said. "Astrobiologists have to have a lot of experience.

"We have detected real fossil microorganisms in meteorites," Rozanov said. "Even 15 years ago, people did not believe there could be fossilized bacteria. "We know now that we can find fossils of bacteria in almost any sedimentary rock."

"In studies carried out independently in Russia and the United States, we have found numerous indigenous microfossils in ancient rocks and meteorites," Hoover said. "Many of the microfossils we have found in the Murchison meteorite are very similar to fossil acritarchs (extinct phytoplankton) and microfossils of cyanobacteria we know from the lower Cambrian phosphorites of Mongolia.

"It was after David McKay's discovery of possible minute fossilized microorganisms in the ancient Mars Meteorite (ALH84001) in 1996 that many scientists started seriously considering the possibility that microbial life may be distributed throughout the Cosmos," Hoover said.

NASA established the Astrobiology Institute in 1997 with the primary question of "is life strictly terrestrial or is life a cosmic imperative."

To help answer this question, Hoover said, "Astrobiologists need to study chemical, mineral and morphological biomarkers in ancient rocks on Earth. This is necessary to develop the knowledge required to recognize evidence of life that may be detected in meteorites or other Astromaterials, such as samples returned from missions to comets, asteroids, Mars, Europa, Io or other bodies of our Solar System.

Photo by Doug Stoffer, NASA/Marshall Space Flight Center

Rozanov, seated, and Hoover study cyanobacteria-like microfossils in the pristine Murchison Meteorite from the Victoria Museum in Melbourne, Australia.

"It is difficult to recognize biology from fossilized remains, because so little is known about fossilized bacteria," Hoover said. To learn more about fossil bacteria, Hoover collaborated with several scientists from the Russian Academy of Sciences. Working with Greg Jerman and James Coston at Marshall, they used Scanning Electron Microscopes to examine ancient viable bacteria from the deep ice at Vostok, Antarctica, and fossil bacteria in ancient rocks.

Rozanov and Hoover — in collaboration with micropaleontologists and microbiologists from the Russian Academy of Sciences — just published their detailed study of living and fossil cyanobacteria entitled, "Atlas of Microorganisms from Ancient Phosphorites of Khubsugul (Mongolia)."

In addition to studying ancient fossilized microorganisms, astrobiologists are exploring the kinds of life that exist in

*See **Microorganisms** on page 9*

NASA Astrobiology Institute announces new teams

NASA release

NASA has selected four new teams to become part of the agency's Astrobiology Institute (NAI), a national and international research consortium that studies the origin, evolution, distribution and future of life on Earth and in the universe.

These new teams of researchers will bring specialized expertise to the Institute, allowing its members to more deeply investigate the diversity of life inhabiting extreme environments on Earth and to develop analytical models to search for habitable planets outside our Solar System.

The Michigan State University in Lansing team, led by Dr. Michael Thomashow, will examine low-temperature Earth analogs to possible life on Mars and Europa by analyzing genetic material and proteins of bacteria from the Arctic and Antarctic permafrost. Data from the gene-expression analysis will be important for understanding the biology of "hitch-hiker" microbes traveling through space on meteorites and other bodies.

The University of Rhode Island in Kingston team, led by Dr. Steven D'Hondt, will examine the deep biosphere of the Earth and the "extremophile" communities that thrive in this extreme environment. This research will include developing biogeochemical markers for life for use on future astrobiology missions.

The new team based at the University of Washington in Seattle will address a broad series of important areas in astrobiology, ranging from biogeochemistry of the earliest life on Earth to the formation, evolution and potential for life on planets outside our Solar System. Dr. Peter Ward leads this team.

Dr. Victoria Meadows will lead the Jet Propulsion Laboratory in Pasadena, Calif., team, which will conduct research on recognizing the biospheres of extrasolar planets. The results of her team's work are expected to directly influence the development of future space missions such as Terrestrial Planet Finder, which will look for habitable planets around other "Suns."

With these additions, the NASA Astrobiology Institute represents a partnership between NASA and 14 major national and three international research institutions to promote, conduct and lead integrated, multidisciplinary astrobiology research and to train a new generation of researchers in the discipline of astrobiology.

The NASA Astrobiology Institute, with its central offices at Ames Research Center in Moffett Field, Calif., was founded in 1997.

More information on the institute is available on the Internet at: *http://nai.arc.nasa.gov/*

Microorganisms

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extreme environments on Earth. Hoover has participated in scientific expeditions to Alaska, North Siberia, the South Pole and the mountains of central Antarctica to sample microorganisms in snow, ice, permafrost and geothermal hot springs.

Information about microbial extremophiles will help determine where and how we should seek evidence of microbial life elsewhere in the solar system. "Observations of distant stars and interstellar clouds shows the laws of physics, chemistry and organic chemistry to work the same way throughout the universe," Hoover said. "Since there is no reason to believe that biochemistry and molecular biology work only on Earth, we must recognize that microorganisms may be widely distributed throughout the Cosmos."

Understanding microbes that live in Earth's extreme environments may give clues to life forms that may inhabit comets, the polar ice caps or permafrost of Mars, the oceans of Europa or the sulfur-rich fumaroles of Io.

"We know that on Earth, the only absolute requirement for life is liquid water," Hoover said. "Wherever we find water, we find life."

The writer, employed by ASRI, is the Marshall Star editor.

The weather inside is frightening at the U.S. Space & Rocket Center

Mother Nature doesn't care. She doesn't care if you live in the finest home in the subdivision or a doublewide in the country, if your village is thousands of years old or if you moved to Florida for the weather or to San Francisco for the culture.

She will wipe you out with a tornado, volcano, hurricane or earthquake and show no mercy. But, why? Why do these life-changing, earth-shattering events occur?

A new exhibit opening Friday and continuing through December at the U.S. Space & Rocket Center provides a lot of answers.

"Powers of Nature" is a 10,000 square-foot, hands-on exhibit bringing visitors into the eye of a hurricane, under the force of a volcano, through the ferocity of a twister, and between the shifting plates of an earthquake. The exhibit is designed to explore the meteorological and geological phenomena that have shaped our planet and the science that defines everyday weather activity.

With exhibit areas dedicated to both storms and geology, "Powers of Nature" utilizes interactive devices, radar and satellite images, video presentations, and artifacts to help the curious unravel the mysteries of meteorology.

Tickets to the Space & Rocket Center are $14.95 for adults and $10.95 for children. A ticket includes "Powers of Nature," one Spacedome IMAX movie, all museum exhibits and activities, and a bus tour of the Marshall Center. Hours are 9 a.m.-5 p.m. until Memorial Day and 9 a.m.-6 p.m. from May 28-Sept. 3.

Think you don't need safety glasses working in your yard? Think again

from Marshall's Safety Office

A contractor employee at the Kennedy Space Center was edging his lawn wearing sunglasses (not safety glasses).

As he was in the process of edging, something brushed his face and knocked the sunglasses off. With both hands busy with the edger, he kept going and didn't stop to investigate the incident.

Shortly, he went back to pick up the glasses, and was shocked to find that a screw had penetrated the sunglasses. The force of this screw hitting the glasses had knocked them off.

This man's brother-in-law is an eye doctor, and he stated that the screw would not have blinded this man. It would have killed him.

Behind your eye socket, there is no bone between the eye and the brain. Anything that has a lot of force can go through the somewhat soft tissue of your eye and into the brain.

Obituaries

Muller, Philip L., 72, of Huntsville, died March 29. He retired from Marshall in 1989 where he worked as an aerospace engineer. He is survived by his wife, Lieselotte Muller.

Eason, James E., 82, of Joppa, Ala., died March 28. He retired from Marshall in 1971 where he worked as a mail clerk.

Randall, Dr. Joseph L. Sr., 68, of Huntsville, died March 24. He retired from Marshall in 1997 where he worked as the director of the Astrionics Lab. He is survived by his wife, Jane Rosa Randall.

Tingley, Joe J., 68, of Athens, died March 15. He retired from Marshall in 1988 where he worked as a documentation management specialist. He is survived by his wife, Eloise Tingley.

Given, Jack F., 86, of Huntsville, died March 14. He retired from Marshall in 1973 where he worked as an aerospace engineering technician. He is survived by his wife, Maude Given.

Futral, Bobby H., 65, of Huntsville, died March 3. He retired from Marshall in 1990 where he worked as an aerospace quality assurance specialist. He is survived by his wife, Wynette Futral.

Politis, Venus K., 80, of Huntsville, died March 1. She retired from Marshall in 1985 where she worked as a secretary.

Bowling, Thomas E., 84, of Huntsville, died Feb. 21. He retired from Marshall in 1974 where he worked as a production controller.

Merrell, Robert L., 75, of Huntsville, died Feb. 20. He retired from Marshall in 1988 where he worked as a mechanical engineering technician. He is survived by his wife, Gloria E. Elkin Merrell.

Cantrell, Eddie R., 69, of Huntsville, died Feb. 10. He retired from Marshall in 1981 where he worked as an aerospace engineer. He is survived by his wife, Nancy K. Cantrell.

Sports

Tennis results

Bill Ludwig and Gordon Siek took first place in Division A of the MARS Tennis Club Open Tournament held March 21. Barry Dawson and Randall Hargrove finished in second. Bill Boglio and Ron Newby finished first in Division B with Larry Newman and Rose Taylor as runners-up. The next tournament will be Henry Rupp Hi-Lo on May 5. For more information, call Larry Craig at 544-7183.

Fishing results

The results from the April 7 MARS Fishing Club bass tournament at Waterfront were: first place — Deon Smith and Ken Vadasy, five fish totaling 11.9 lbs.; second place — John Harbison and Paul Brock, five fish totaling 11.38 lbs.; and third place — Charlie Nola and Ken Anthony, four fish totaling 9.77 lbs. Big fish honors went to John Harbison with a 3.10-lb. large mouth. The next club tournament will be the annual bream tournament on April 28 at Brown's Creek off Lake Guntersville. For more information, call Don McQueen at 544-9073, Charlie Nola at 544-6367 or John Pea at 544-8437.

Golf tournaments

Upcoming golf tournaments include a skins tournament at 7:30 a.m. April 21 at Goose Pond Plantation — entry deadline is April 13 — and a two-person best score tournament at 7 a.m. May 19 at Guntersville State Park. The entry deadline for the Guntersville tournament is May 11. You can select your own partner for the two-person best score events. If you do not have a partner, call in to enter as early as possible and the tournament director will team you up with another single entrant. The entry fee for each tournament is $5. Greens fees and cart fees will vary depending on the course. Enter a tournament by contacting Lee Foster at 544-1589, Joey Butler at 544-3808 or Robert Rutherford at 544-8117.

History chat

George Hopson, Marshall's Space Shuttle Main Engine manager, will present the second in a series of history chats celebrating the 20th anniversary of STS-1 at 11:30 a.m. Wednesday in the heritage Gallery in Bldg. 4203. Hopson will reminisce about his experiences in the development of the elements that were used in the first Shuttle flight.

Mentoring program

Eminent project managers Emery Reeves, Fred Wojtalik, Jerry Gliksman and Jean Olivier are available for consultation with Marshall's program and project managers on an as-requested basis. For appointments, call Ann Pigg at 544-0570. Schedules and biographies are available on the Web at: *http://smo.msfc.nasa.gov/smo/customer/training/mentors/*

Health Odyssey 2001

The fourth annual Health & Fitness Expo will be from 10 a.m.-2 p.m. April 18 at the Bldg. 4752 north structure. A variety of vendors and exhibitors from the medical and health fitness community will display products attendees may try and also buy. The Expo will also include Health & Fitness demonstrations and the "Annual Walk for the Health of It " at 11 a.m. The special "Golden Shoe" trophies will be awarded to the directorate having the most participants and the directorate having the highest percentage of participants in the walk. Door prizes will be awarded.

Earth Week activities

Earth Week activities at Marshall will be held April 16-20. This year's theme is 2001: An Earth Odyssey. Besides environmental, recycling and energy displays in the lobby of Bldg. 4200, there will be a tree planting ceremony from 10-11 a.m. April 19 on the north side of Bldg. 4619.

Information symposium

A jointly sponsored, government and industry supportability information exchange symposium will be held from 1 p.m. May 7 through nooon May 11 at the Bob Jones Auditorium in the Sparkman Center Complex Bldg. 5304 on Redstone Arsenal. The symposium, sponsored by the U.S. Army Materiel Command Logistics Support Activity, is open to all government and contractor employees. Cost is $100. For more information, call Emerson McAfee at 955-0808.

ASEM conference

The American Society for Engineering Management (ASEM) will hold its 2001 conference Oct. 11-13 at the Huntsville Marriott. Abstracts on research results, instructional issues, work in progress, research proposals, and case studies are solicited. For more information, call Pamela Takada at 544-3645. Due dates and specifics are available on the conference Web site at: *http://www.engineering-management.org* or *http://www.asem.com*

Clubs and Meetings

NARFE meets

The National Association of Retired Federal Employees (NARFE) will meet at 10 a.m. April 14 at the Senior Center on Drake Avenue. Larry Denman, head of Huntsville Utilities' energy management and conservation programs will speak. Refreshments will be served at 9:30 a.m. For more information, call 881-4944 or 881-3168.

Shuttle Buddies meet

The Shuttle Buddies will meet for breakfast at 9 a.m. April 23 at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757 or Gail Wynn at 852-8189.

Genealogical Society meets

The Huntsville Genealogical Computing Society will meet at 7 p.m. April 16 in the auditorium of the Huntsville-Madison County Main Library. Steve Maze, a fellow genealogist and north Alabama magazine publisher and author, will give an interesting and humorous talk entitled, "Yesterday's Memories."

MOO meets

The Management Operations Office (MOO) retirees will meet for breakfast/lunch at 10 a.m. April 26 at the cracker Barrel Restaurant in Madison. For more information, call 539-0042.

NASA Exchange

NASA Goes to the Stars

NASA Goes to the Stars at 7:05 p.m. Friday at Joe Davis Stadium in Huntsville for the baseball season opener between the Huntsville Stars and the West Tennessee Diamond Jaxx. Astronaut Ken Cockrell, a veteran of four space flights totaling more than 1,215 hours in space, will throw out the first pitch. Cockrell commanded the Shuttle STS-98 mission in February which delivered the U.S. Lab "Destiny" module to the International Space Station. Marshall Center's NASA Exchange, the Center's morale and welfare organization, is sponsoring a ticket buyout for employees, contractors and the public. Tickets are free and available at Parkway City Mall and Madison Square Mall in Huntsville and Colonial Mall in Decatur. The first 1,000 fans will also receive NASA's new coloring book.

Taxes

I'm proud of paying taxes. The only thing is — I could be just as proud for half the money.

— Arthur Godfrey

Employee Ads

Miscellaneous

★ Two cemetery lots w/vaults, Huntsville Memory Gardens, $1,200; computer desk, new, $50; queen quilt, $45. 534-0939
★ Infant car seat, $15; bouncy seat, $15; two children's bed rails, $30. 851-0556
★ J.D. 21S string trimmer, $125; Bose 201 speakers, $125; HP computer, 400mhz, 96MB, 10G, no monitor, $390. 325-6000
★ Battery wheelchair, electric mobility, 11 yrs. old. 534-6640
★ Mower, John Deere 165, 16HP, hydrostat, 42" cut, bagger, extra set of blades, $800. 232-9303
★ Little Tykes activity garden, 18 mo., $20; LT riding pony, 9 mo., $15. 830-5001
★ Electric treadmill, Weslo Kadence DX-5, $125 obo. 461-8369
★ Round oak table w/walnut stain, 4 chairs, $160; car bed w/canopy, $110. 464-9709
★ 1993 Harley Davidson Sportster, XLH 883, 14K miles, many extras, $7,500 obo. 882-9053
★ Portable kerosene heater, 22,300 btu/hr., new, never used, $100 obo. 883-0503
★ 1997 Coleman pop-up camper, 2-king beds, a/c, 2-stoves, front storage, refrigerator, couch, table, $5,900. 852-0142
★ Kitchen sink, 4 hole, stainless steel, 32x19x6, w/strainers and faucet, $50 obo. 461-8369
★ Spectrum pontoon, 24 feet, $6,000. 722-9989
★ Aquarium, 55-gallon w/oceanic custom wood stand, complete w/pumps, gravel, accessories, $250. 882-1566
★ Toyota shop manuals for 1992 Camry, two volume repair manual, $35; electrical wiring manual, $10. 883-2877
★ 1998 Coleman SeaPine pop-up camper, 13,500 BTU a/c, 3-way refrigerator, in/out stovetop, couch/dining table, awning, sleeps 6-8, $5,300. 653-3625
★ 2001 mobile home, new, located near Auburn University campus, $28,500. 334-821-7388
★ Two wool rugs, 1 - $300, 1 - $200; wood TV stand, $150; digital pictures available. 881-4701
★ 1989 Wellcraft 192 Classic, cuddy cabin, 4.3L V-6, 450 hours, $6,500. 797-6173
★ Golf clubs, 1, 3 & 5 metal woods; 3 PW with bag, $200. 232-1171
★ Troy-Bilt 5HP chipper vac, self-propelled, all accessories, $700. 232-6715
★ Huffy Ride 'n' Run, bike trailer and jogger, sun shade and bug screen, 75 lb. limit, $95. 880-3263
★ Golden Ram golf clubs, 2 sw, new grips, putter, Sunday bag, $125; Adams Titanium driver, 9 deg. Loft, $150. 828-0801
★ 1998 Starcraft trailer, ac/heat, microwave/oven, bath/shower, sleeps 6, $10,500; Yamaha V Star classic, garage kept, $5,700. 828-290/720-7024
★ Boat and boat house w/lift for up to 26' boat at Whitesburg Boat & Yacht club, Huntsville, $20,000. 539-5058
★ Handicapped lift chair, $125; new set of Goldwin AVDP irons, 3 PW, regular graphite shafts, $150. 534-7914
★ Sofa sleeper, 3-piece fold-out, navy blue; Panasonic color TV, 21", non-cable ready; $50 each obo. 751-2131
★ Large multi-level step (for step aerobics). 228-4735
★ Abuglass boat, 17', 115HP Johnson outboard, 18 gal. Internal gas-tank, drive–on trailer, $1,500. 852-6801

Vehicles

★ 1996 Ford Windstar, 31K miles, white, front/rear a/c, handicapped ramp van, hand-controls, automatic lock-downs for wheelchair, $25,500. 852-7828
★ 1993 Dodge Grand Caravan SE, own-owner, many new parts, service records available, $4,995. 895-9520
★ 2000 Honda Accord EX, 5-speed coupe, all-power, moon-roof, alloy wheels, keyless, CD, A/C, 14K miles, $16,949. 922-1508
★ 1987 Nissan SE pickup truck, V-6, extended cab, w/camper shell, 160K miles, $1,500 obo. 852-9995
★ 1986 Toyota Cressida, auto, V-6, 147K miles, $2,100. 722-9212
★ 1989 Buick Park Avenue, low mileage, many power options, new air & brakes, $3,400. 534-7791
★ 2000 Chevrolet S-10 extended-cab pickup, 5-speed, a/c, center console, AM/FM, bedliner, new fiberglass camper shell, 13K miles, $12,195. 922-1508
★ 1993 Buick Century, a/c, p/l, p/s, 160K miles, $4,500. 828-6158
★ 1992 Dodge Caravan van, low miles, new tires, asking $4,200. 461-8182
★ 1979 Chevy pickup, 95K miles, tool box, good tires, 8' bed, automatic, $1,750. 650-0677
★ 1982 Allegro 27' motor home, new tires/beauty rims, sleeps 8, 6.5KW Onan generator, gas grill, microwave, low miles, many extras, $10,500. 990-7708

Found

★ Bracelet, Bldg. 4200 cafeteria. 544-4758 to identify/claim
★ Umbrella, Bldg. 4200, G13 classroom. Call 544-4758 to identify/claim
★ Gold pendant without chain in Ladies Room, Lobby, Bldg. 4200. 544-0514/3749
★ Electric razor, Bldg. 4200. Call 544-4758 to identify/claim

Free

Dog, 1 yr. old, all shots current, doesn't bite humans, kills rats, keeps watch. 534-5793

To good home, 4-month old part Boxer & Labrador Retriever puppy, fun loving and playful. 430-0759

Wanted

★ Air conditioner that will fit through a 33.5" x 14.75" opening. 721-9132

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